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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/785,939	02/15/2001	Masahiro Kuwabara	09952/053001/55543-US-KK/	4409

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EXAMINER

SHAHRIER, SHARIF M

ART UNIT

PAPER NUMBER

2664

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/785,939

Applicant(s)

KUWABARA ET AL.

Examiner

Sharif M Shahrier

Art Unit

2664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4 is/are rejected.
- 7) ☒ Claim(s) 3, 5 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2-15-01</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim1 is rejected under 35 U.S.C. 102(e) as being anticipated by H'mimy (US 5,912,876).

Regarding claim 1, H'mimy describes an OFDM receiver system. H'mimy describes a method of receiving an OFDM signal and the process of extracting the information and known signals from the OFDM signal (col 4, ln 58 – col 5, ln 45).

H'mimy teaches that a **mixer** element combines the information signals (main signal) and the known signal (pilot signal) to generate a composite signal (col 3 ln 10-16). Thus, it is inherent that the known signals are dispersed in the information signals in the received OFDM composite signal.

H'mimy teaches an inverse fast Fourier transform (IFFT) (col 3 ln 16-18). It is common knowledge that the IFFT can position the known and information signals to the frequency bands as described in claim 1.

Regarding **transmission path response** is equivalent to **frequency response**.

H'mimy teaches a method and apparatus for calculating the frequency response using extracted known signals (pilot signals) (col 5 ln 13-15).

Regarding **transmission path characteristics** is equivalent to **channel estimation**.

H'mimy teaches a technique for **channel estimation**, using the extracted main signal and pilot signal (col 4 ln 58 – col 5 ln 45). This is accomplished using all the recovered information signals (col 5, ln 9-12) and the recovered pilot signal (col 5 ln 13-14).

H'mimy further teaches about using **channel estimation** and **equalization** for compensating amplitude and phase errors (col 1 ln 57-58) and (col 1 ln 66-67).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over H'mimy, in view of Siala (US 6,768,713).

Regarding claims 2, H'mimy discloses all aspects of the claimed invention set forth in the rejection of claim 1.

Re-iterating, **transmission path characteristics** is equivalent to **channel estimation**.

H'mimy does not explicitly disclose estimating channel path characteristics by linear interpolation.

However, Siala teaches channel estimation using interpolation (col 2 ln 14-17).

In view of this, having the system of H'mimy and then given the teaching of Siala, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of H'mimy to incorporate the teachings of Siala.

The motivation to combine is because interpolation allows one to carry out an estimation of the channel at the positions of the pilot symbols and then extend this estimation to the data signals (col 2 line 30-33).

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over H'mimy, and in view of Wahlqvist (US 6,088,398).

Regarding claims 4, H'mimy discloses all aspects of the claimed invention set forth in the rejection of claim 1.

H'mimy does not explicitly disclose estimation of the transmission path characteristics by interpolation using Sinc functions.

However, Wahlqvist teaches about a receiver comprising a channel estimation mechanism (col 7 ln 60). He further teaches about implementing the fast fourier transform (FFT) algorithm using Sinc function ($\text{Sin}(x)/x$) (col 3 ln 3-6). The FFT is an essential component of measuring the frequency response. It is common knowledge that interpolation allows one to extend results from a small set of data points (pilot data symbols), to the responses that could be obtained for a larger set of data points.

In view of this, having the system of H'mimy and then given the teaching of Wahlqvist, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of H'mimy to incorporate the teachings of Wahlqvist.

The motivation to combine is because sinc functions can be easily manipulated to taper off interference signals in the adjacent side bands. Using interpolation on a small set of points necessitates less pilot symbols to be transmitted, thus saving bandwidth and power in the transmission.

Claim Allowable

6. Claims 3 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusions

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharif M Shahrier whose telephone number is (703) 305-870. The examiner can normally be reached on 8:30-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (703) 305-4798.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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SMS


RICKY NGO
PRIMARY EXAMINER